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A new coprophilous *Gilmaniella* species from Malaysia

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Abstract — *Gilmaniella nyukfahii* sp. nov., collected from cow dung in Malaysia, is described and illustrated. It differs from other *Gilmaniella* species in having globose conidia with 5–7 distinct germ pores.

Key words — dung fungi, dematiaceous hyphomycete, mitosporic fungi, saprotroph, taxonomy

Introduction

Species of *Gilmaniella* G.L. Barron (Barron 1964) are fungi that produce masses of dematiaceous conidia from superficial semi-macronematous and mononematous conidiophores (Ellis 1971). The conidia are unicellular, with one or several distinct germ pores (Umali et al. 1998). There are eight reported species of *Gilmaniella* (Index Fungorum 2013). Umali et al. (1998) reviewed and keyed the seven *Gilmaniella* species known at that date. Dubey et al. (2011) described a foliicolous species, *G. indica* Dubey et al., in which the conidia have a single germ pore similar to those of *G. humicola* G.L. Barron.

During a survey of fungal diversity from cow dung in Malaysia, we found an undescribed species of *Gilmaniella* in cow dung samples incubated at 28°C. This species is described here and compared with other *Gilmaniella* spp.; its holotype is conserved at the herbarium of the Centre for Biodiversity Research, Faculty of Science, Universiti Tunku Abdul Rahman (Perak campus), Kampar, Malaysia (UTAR).

Taxonomy

Gilmaniella nyukfahii Goh, L.L. Lee & K.C. Teo, **sp. nov.** Figs 1–11

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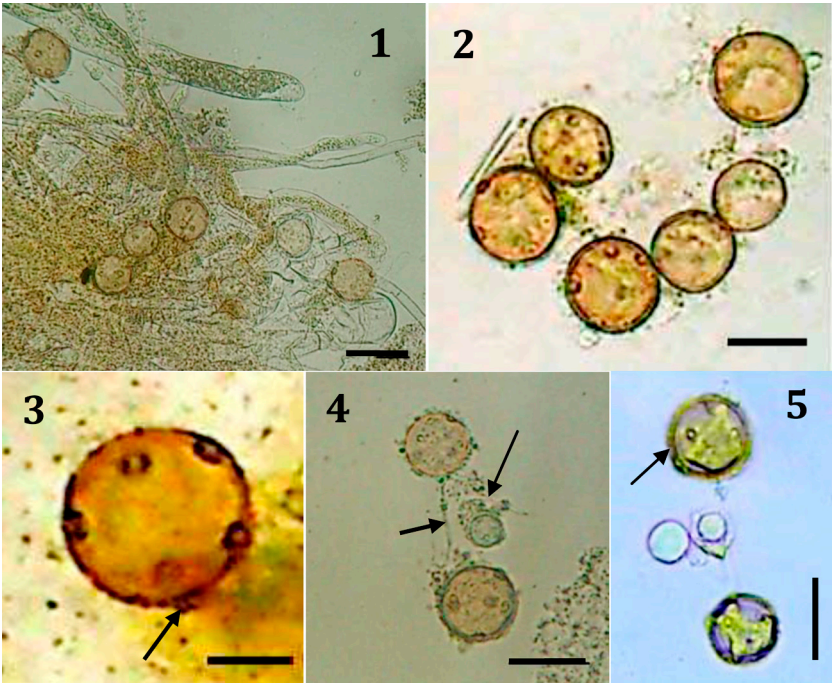


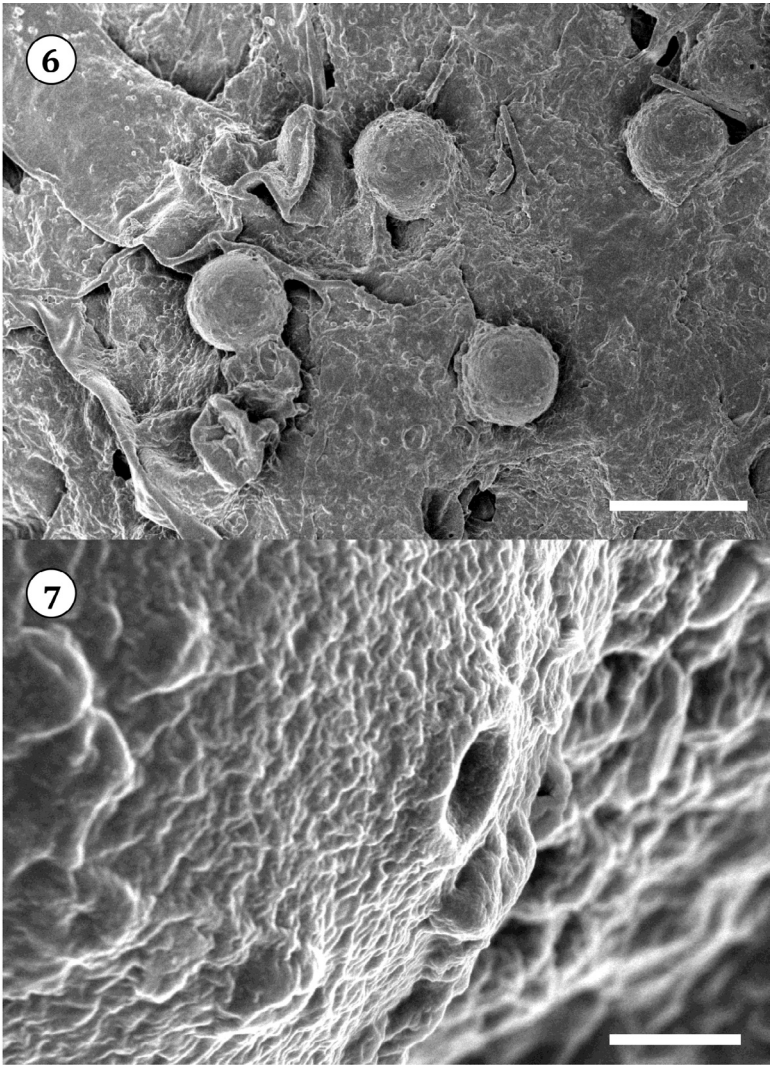
Figs 1–5. *Gilmaniella nyukfahii* (holotype). 1. Conidia from natural substratum, scattered among hyphae of other fungi (e.g., zygomycetes) and bacterial mass. 2. Conidia, each with multiple germ pores. 3. Conidium with six visible germ pores; arrow points to a protruding germ pore; the conidial wall is somewhat roughened. 4. Conidia with germ pores; the conidiophore (arrowed) is delicate, hyaline, and hypha-like. 5. Developing and near-mature conidia (showing germ pores); the conidia are thick-walled (arrowed). Scale bars: 1 = 20 µm; 2, 5 = 10 µm; 3 = 5 µm; 4 = 15 µm.

Differs from other species of *Gilmaniella* in having conidia with 5–7 distinct germ pores.

Type: Malaysia. Perak, Kampar, on cow dung incubated at 28°C, November 2012, Li-Ling Lee, (**Holotype**, UTAR(M)-0001).

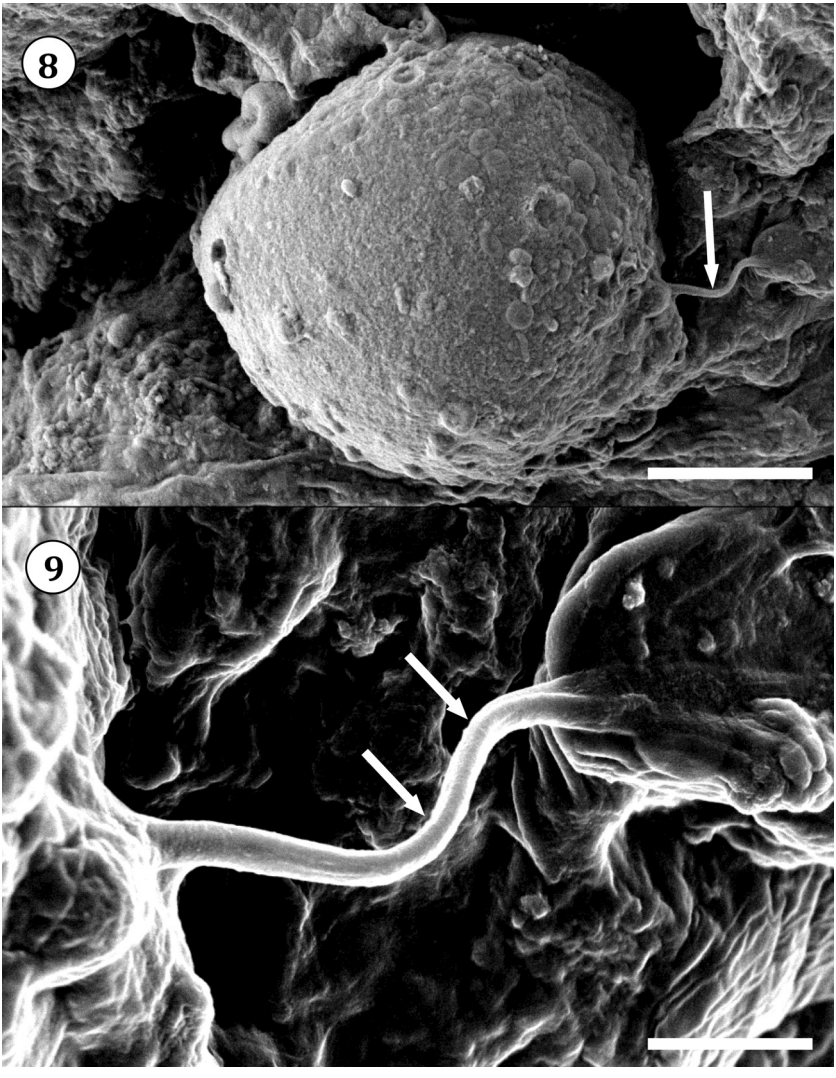
Etymology: *nyukfahii*, derived from the name of the second author's uncle, Nyuk Fah Lee, for his financial support of her studies at UTAR, Malaysia.

Colonies on natural substratum effuse, grayish, mycelium superficial and immersed; stroma none; setae and hyphopodia absent; aerial hyphae absent; conidiophores micronematous to semi-macronematous, mononematous, straight or flexuous, thin-walled and delicate, smooth, hyaline, 0–3-septate, up to 5 µm long and ca. 0.2–0.5 µm wide; conidiogenous cells monoblastic and polyblastic, integrated, terminal and intercalary, determinate, hyaline; conidia holoblastic, acropleurogenous, solitary, globose, 10–13 µm in diameter, one-



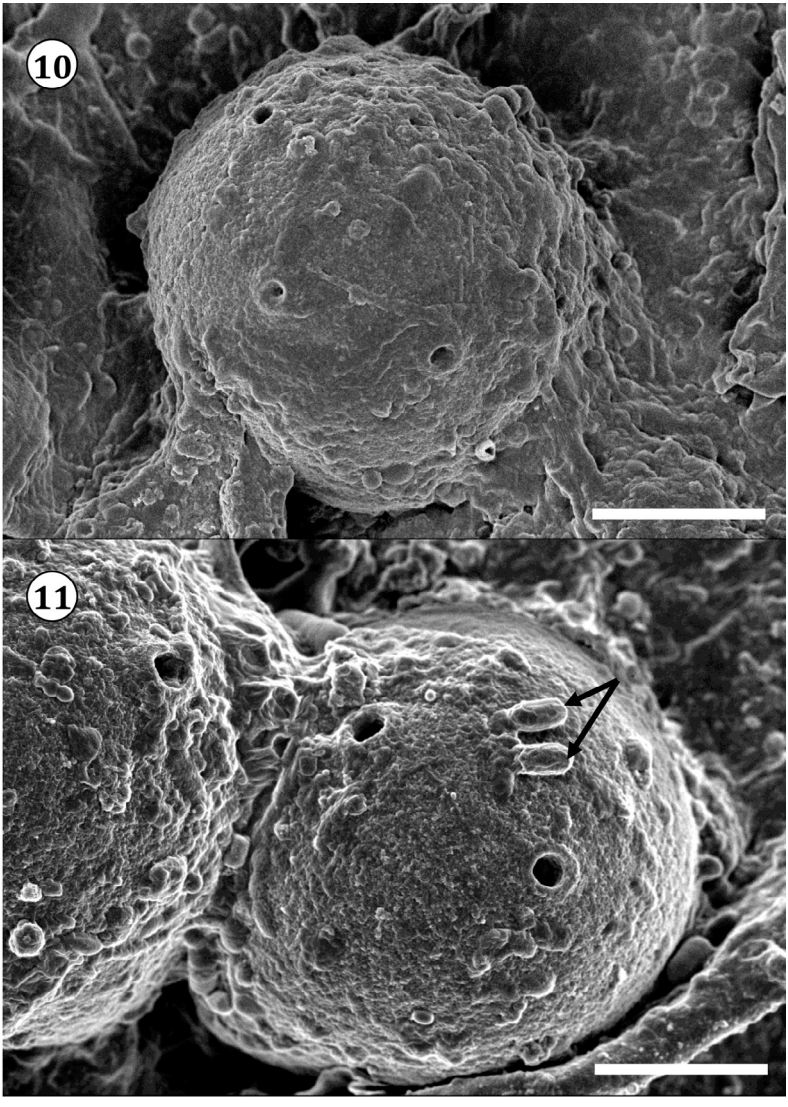
Figs 6–7. *Gilmaniella nyukfahii* (holotype, SEM). 6. Conidia on surface of natural substratum. 7. Conidial germ pore which is polygonal in surface view; the conidial wall is rugose in texture. Scale bars: 6 = 20 µm; 7 = 1 µm.

celled, thick-walled, slightly rugose or verrucose, yellowish or pale olivaceous brown when mature, with 5–7 distinct, somewhat protruding, polygonal germ pores which are ca. 0.5–0.8.5 µm diam.; conidial secession schizolytic.



Figs 8–9. *Gilmaniella nyukfahii* (holotype, SEM). 8. Conidium still attached to the delicate conidiophore (arrowed). 9. Conidiophore, which is smooth-walled and septate (arrowed). Scale bars: 8 = 5 μm; 9 = 1 μm.

Comments— Superficially, *Gilmaniella nyukfahii* resembles *Trichocladium ismailiense* Moustafa & Ezz-Eldin, which also produces dematiaceous conidia with several germ pores (Moustafa & Ezz-Eldin 1990, Goh & Hyde 1999). However, the conidial development in *Trichocladium* is holothallic (sensu Cole



Figs 10–11. *Gilmaniella nyukfahii* (holotype, SEM). 10. Conidium with multiple, somewhat protruding, distinct germ pores. 11. Conidia with germ pores; cocci and rod-shaped bacterial cells (arrowed) are visible clinging to the conidial surface. Scale bars = 5 μm.

& Samson 1979), whereas in *Gilmaniella* it is mono- or polyblastic. Additionally, in accepted species of *Trichocladium*, conidia are septate (Goh & Hyde 1999), whereas conidia of *Gilmaniella* species are unicellular (Umali et al. 1998).

Among the eight previously described *Gilmaniella* species, only *G. multiporosa* Moustafa & Ezz-Eldin is similar to *G. nyukfahii* in having conidia with more than one germ pore. However, *G. multiporosa* differs from our new species in several characters: habitat (soil), conidial shape (clavate to pyriform), conidial formation (clustered or catenate), and number of germ pores per conidium (1–4, mostly 2–3; Moustafa & Ezz-Eldin 1989).

In addition to producing conidia with 5–7 distinct germ pores, *G. nyukfahii* is also unique in its conidiophores, which are slim and delicate, and the details of which can be revealed only under the electron microscope.

Under the scanning electron microscope, the spore wall of *G. nyukfahii* appears slightly rugose and is coated with dung debris. Some bacterial cells (cocci and rods) adhering to the hyphae and spores are commonly observed in this habitat.

We have attempted unsuccessfully to grow *G. nyukfahii* in culture. At least 20 single spores of this species were isolated from its natural substratum using the method described by Goh (1999), but none germinated, whether on water or cow dung agar (Bills & Foster 2004). The failure of spore germination on artificial media might be due to the lack of certain environmental conditions or specific nutrient requirements for this particular species, which were not met in this study.

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